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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,613	02/18/2004	Makoto Iwashima	50195-417	8884

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McDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DE 20005-3096

EXAMINER

NGUYEN, HANH N

ART UNIT	PAPER NUMBER
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2834

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/779,613	Applicant(s) IWASHIMA ET AL.	
	Examiner HANH N. NGUYEN	Art Unit 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE filed 3/5/09.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17, 19 and 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17, 19 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Couture (Provided by Applicant as US 5,355,039).

Regarding claim 1, Couture discloses a converter arranged in series with a motor to form a unitary structure through which an output shaft extends, comprising: a plurality of coolers (arm 13 in Fig. 2 Col. 10, lines 45-50) each of which extends along a radial direction with respect to an output shaft (2 in Fig. 15 and Col. 12, lines 15-20) so as to be perpendicular to the output shaft and has a cooling surface defined by a direction parallel to the output shaft and the radial direction; and a power semiconductor module(14 in Fig. 2) mounted on the cooling surface of at least one of the plurality of coolers and extending in the radial direction along with the cooling surface of the cooler to supply electric power to a motor.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-10, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gruendel et al (previously cited as DE 10112799). in view of Couture (provided by the Applicant as US 5,355,039)

With respect to claim 1, Gruendel et al. disclose a converter arranged in series with a motor to form a unitary structure through which an output shaft extends, comprising: a plurality of coolers (#40, Fig. 1) each of which extends along a radial direction with respect to an output shaft (#18, Fig. 1) so as to be perpendicular to the output shaft and has a cooling surface defined by a direction parallel to the output shaft and the radial direction; and a power semiconductor module(#46, Fig. 1) mounted on the cooling surface of at least one of the plurality of coolers to supply electric power to a motor. Gruendel et al. fail to show the plurality of coolers extending in the radial direction along with the cooling surface of the cooler.

However, Couture discloses a power converter arrangement comprising a plurality of coolers (#13, Fig. 2) extending in the radial direction along with the cooling surface of the cooler for the purpose of providing means of cooling down the assembly when it is operating (Col. 2, lines 23-26).

Since Gruendel et al. and Couture are in the same field of endeavor, the purpose disclosed by Couture would have been recognized in the pertinent art of Gruendel et al.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify Gruendel et al. by forming a plurality of coolers extending in the radial direction along with the cooling surface of the cooler as

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taught by Couture for the purpose of providing means of cooling down the assembly when it is operating.

Moreover, It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to form a plurality of coolers extending in the radial direction along with the cooling surface of the cooler since it has been held that changing the position of an element of an invention is prima facie obvious in the absence of new or unexpected results (In re Japikse, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950)).

With respect to claim 2, Gruendel teaches the power converter wherein the output shaft includes a motor shaft.

With respect to claim 3, Gruendel teaches the power converter wherein each of the plurality of coolers includes a plurality of cooling surfaces (the mounting and finned surfaces of the coolers), and each is defined by the direction parallel to the output shaft and the radial direction (as seen in Fig. 1).

With respect to claim 4, Gruendel teaches the power converter wherein each of the plurality of coolers includes a set of coolers opposing one another, and each of the set of coolers extends along the radial direction (as seen in Fig. 1, each cooler is opposed by another positioned 180 degrees away from it).

With respect to claim 5, Gruendel teaches the power converter wherein each of the plurality of coolers is mounted on a cylindrical structural member (Fig. 1, #28) surrounding the output shaft.

With respect to claim 6, Gruendel teaches the power converter of claim 1, wherein each of the plurality of coolers is mounted on a structural member located at an end face of a motor (as seen in Fig. 1, the coolers are mounted on an external portion of the motor housing).

With respect to claim 7, Gruendel teaches the power converter wherein each of the plurality of coolers includes a plurality of coolant passageways (the channels between the fins) that extend in parallel to the output shaft (as seen in Fig. 1).

With respect to claim 8, Gruendel teaches the power converter wherein each of the plurality of coolers includes a plurality of cooling passageways (the channels between the fins) that extend along the radial direction.

With respect to claim 9, Gruendel teaches the power converter wherein an end portion of each of the coolers is connected to a delivery conduit (which inherently exists, Paragraph 30) communicating with coolant passages (Fig. 1, #32) of the other of the plurality of coolers.

With respect to claim 10, Gruendel teaches the power converter wherein an end portion of each of the plurality of coolers is connected to an annular coolant passage (Fig. 1, #32) connected to a coolant delivery conduit (which inherently exists, Paragraph 30) connected to a power converter.

With respect to claim 19, Gruendel teaches the power converter of wherein the plurality of coolers are arranged along corresponding radial directions, each of which is

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perpendicular to the output shaft, at circumferentially spaced intervals there between (as seen in Fig. 1).

With respect to claim 21, Gruendel teaches the power converter wherein the power converter and the motor are combined coaxially in series with each other (power converter and motor have common axis) and Couture shows the radial direction is a direction perpendicularly extending from the output shaft, and the cooling surface is defined by a direction parallel to the output shaft and a direction parallel to the extending direction (Fig. 2).

3. Claims 11 & 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishiyama (US 5632351 previously presented) in view of Gruendel et al. (DE 10112799) and Couture.

Ishiyama teaches a capacitor disposed between respective ones of a plurality of heat sinks adapted to smooth a DC voltage, a current sensor (Fig. 2, #29 # 30) disposed in a corner section projecting from a cross sectional circular shape of a power converter and detecting output currents of the power semiconductor module, an AC output terminal (Fig. 2, #26) disposed in a corner section projecting from a cross sectional circular shape of a power converter and connecting a power converter and a motor, wherein the AC output terminal is a three-phase output terminal and has three output terminals (Fig. 2, #26-28), and each of the three output terminals is disposed in a corresponding one of three corner sections projecting from the cross sectional circular shape of the power converter, and further comprising a DC power input terminal (Fig. 2,

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#39) disposed in a corner section, projecting from a cross sectional circular shape of a power converter, in which no other component elements are located, but it does not teach a plurality of coolers each of which extends along a radial direction with respect to an output shaft so as to be perpendicular to the output shaft, and having a cooling surface defined by a direction parallel to the output shaft and the radial direction; and a power semiconductor module mounted on the cooling surface of at least one of the plurality of coolers to supply electric power to a motor. However, Gruendel and Couture teaches the power converter of claim 1 (as described above). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the cooling structure of Ishiyama in view of the cooling structure as taught by Gruendel and Couture because it provides a cooling means for power semiconductors that is compact, economically producible and reliable (Gruendel, Paragraph 13).

4. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishiyama (US 5632351 previously presented) in view of Gruendel et al. (DE 10112799) and Couture and further in view of Kim et al. (US 2001/0054730 previously presented). Ishiyama in view of Gruendel and Couture teaches the power converter of claim 11, but it does not teach that the capacitor has a cross sectional shape formed in a fan-shape or a trapezoid. However, Kim teaches a capacitor that has a trapezoidal cross sectional shape (Paragraph 30). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the capacitor of Ishiyama in view of the capacitor as taught by Kim because it has a high dielectric constant while avoiding a degradation in the capacitance (Kim, Paragraphs 6,8 & 11).

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5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gruendel et al. (DE 10112799) and Couture in view of Jackson et al. (US 2,942,165 previously presented). Gruendel and Couture teach the power converter of claim 1, wherein each of the plurality of coolers has a pair of cooling surfaces, and terminals of the power semiconductor module are mounted on one of the pair of cooling Surfaces, but do not teach that the power semiconductor module is mounted on both sides of the coolers, or that terminals of the power semiconductor modules have a symmetric relationship with those on the other cooling surfaces with respect to a corresponding side of the plurality of coolers. However, Jackson teaches a cooler (Fig. 2, #6) with a pair of cooling surfaces upon each of which is mounted a semiconductor device (Fig. 2, #1-5). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the coolers of Ishiyama and Couture in view of the cooler as taught by Jackson because it provides a rectifier assembly that has a minimum bulk, but which dissipates heat losses with a high efficiency (Col. 1, Lines 42-45).

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh N Nguyen whose telephone number is (571) 272-2031. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Quyen Leung, can be reached on (571) 272-8188. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and (571) 273-8300 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1000.

HNN

March 21, 2009

/Nguyen N Hanh/

Primary Examiner, Art Unit 2834

(New) the power converter wherein the power converter and the motor are combined coaxially in series with each other, the radial direction is a direction perpendicularly

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extending from the output shaft, and the cooling surface is defined by a direction parallel to the output shaft and a direction parallel to the extending direction.